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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.
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09/437,607 11/10/99 CHANEY

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ARENT FOX KINTNER PLOTKIN & KAHN
1050 CONNECTICUT AVENUE, N.W.
SUITE 600
WASHINGTON DC 20036

EXAMINER

IBRAHIM, M

ART UNIT

PAPER NUMBER

1638

DATE MAILED:

07/18/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

Office Action Summary	Application No.	Applicant(s)	
	09/437,607	CHANEY ET AL.	
	Examiner	Art Unit	
	Medina Ibrahim	1638	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 April 2001.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-47 is/are pending in the application.
- 4a) Of the above claim(s) 5-7, 19-37 and 41-47 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-4, 8-18 and 38-40 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on _____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) <u>4, 5</u> . | 6) <input type="checkbox"/> Other: |

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DETAILED ACTION

Election/Restriction

1. Applicant's election without traverse of Group I, claims 1-4, 8-18, 38-40 in Paper No. 11 is acknowledged.

Claims 1-47 are pending in this application.

Claims 5-7, 19-37, and 41-47, drawn to a non-elected invention, are withdrawn from consideration.

Claims 1-4, 8-18, 38-40 are under examination.

Information Disclosure Statement

2. Initialed and dated copy of Applicant's IDS form 1449, Paper Nos. 4 and 5 are attached to the instant Office action.

Drawings

3. No drawings were filed in the instant application.

Claim Rejections - 35 USC § 112, second paragraph

4. Claims 1-4, and 8-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claims 1 and 10, "elevating", and in claim 3 "elevated" respectively, are relative terms which lack comparative basis. Would a 0.0001 increase ⁴pH ^{is} "elevated"? Dependent claims 2, 4, 8-9, 11-18 are included in the rejection.

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Claims 9 and 14 recite "a mixture thereof" should be "combinations thereof". Dependent claims 16-18 are included in the rejection.

Claims 38-40 recite "factor 2, 3, or 4", it is unclear how the factor is calculated.

Scope of Enablement

5. Claims 1-4 and 38-40 are rejected under 35 U.S.C. 112, first paragraph, because the specification, while being enabling for the use of the hyperaccumulator of Alyssum plant species that accumulates nickel from nickel- contained soil, does not reasonably provide enablement for any hyperaccumulator plant that accumulates exemplified or non-exemplified heavy metals from metal-contaminated soils. The specification does not enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention commensurate in scope with these claims.

The claims are broadly drawn to a method for selectively increasing the amount of at least one metal recovered from metal containing soil comprising elevating soil pH, and cultivating any hyperaccumulator plant in said soil under conditions that would permit said plant to accumulate at least 4.0 % of Ni on dry wt basis in above ground tissues, and whereby the concentration of said metal in said tissues exceeds the concentration of said metal in the soil by factor of 2, 3, or 4. In contrast, the specification provides guidance only for the removal of nickel by cultivating at least one Alyssum plant species in a soil contaminated with nickel, wherein the soil conditions are optimized for the high recovery of nickel, and wherein at least 4.0% (dry wt basis) of the above ground tissues is nickel. The specification does not provide guidance for the use of non- Alyssum

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plant for the removal of the exemplified or non-exemplified heavy metals. No guidance has been provided for the identification of other metal-hyperaccumulator plants or their specific soil conditions, including soil pHs, fertilizers, chelating agents, which would permit said non-Alyssum species to accumulate heavy metals, especially the claimed concentrations of claims 16-18, and 38-40. Applicants have provided lack of guidance for the claimed method step of "elevating soil pH" (see claim 1). No guidance is provided for obtaining or evaluating plants which hyperaccumulate heavy metals from structurally and biochemically complex media such as soil, which contains a multitude of microorganisms which interact in metabolizing, sequestering and/or secreting various metal ions. Furthermore, the soil microorganisms would alter the acidity of the soil due to their metabolic activity, which alteration would affect the soil's ability to bind the heavy metal ions, which would affect the ability of plants to recover such ions from the soil and overaccumulate them. It is unlikely that the method provided in the specification for removing heavy metals by "elevating soil pH" for Alyssum plants is applicable for other unidentified metal-hyperaccumulators. Therefore, the claimed invention could not be practiced without undue experimentation, as broadly claimed. Undue experimentation would have been required to identify other metal-hyperaccumulator plants and evaluate their ability to accumulate the concentrations of heavy metals claimed in claims 16-18, and 38-40.

Double Patenting

6. The nonstatutory double patenting rejection is based on a judicially created doctrine grounded in public policy (a policy reflected in the statute) so as to prevent the unjustified or improper timewise extension of the "right to exclude" granted by a patent and to prevent possible

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harassment by multiple assignees. See *In re Goodman*, 11 F.3d 1046, 29 USPQ2d 2010 (Fed. Cir. 1993); *In re Longi*, 759 F.2d 887, 225 USPQ 645 (Fed. Cir. 1985); *In re Van Ornum*, 686 F.2d 937, 214 USPQ 761 (CCPA 1982); *In re Vogel*, 422 F.2d 438, 164 USPQ 619 (CCPA 1970); and, *In re Thorington*, 418 F.2d 528, 163 USPQ 644 (CCPA 1969).

A timely filed terminal disclaimer in compliance with 37 CFR 1.321© may be used to overcome an actual or provisional rejection based on a nonstatutory double patenting ground provided the conflicting application or patent is shown to be commonly owned with this application. See 37 CFR 1.130(b).

Effective January 1, 1994, a registered attorney or agent of record may sign a terminal disclaimer. A terminal disclaimer signed by the assignee must fully comply with 37 CFR 3.73(b).

7. Claims 1-4, 8-18, and 38-40 are rejected under the judicially created doctrine of obviousness-type double patenting as being unpatentable over claims 1-5 of U.S. Patent No. 5,711, 784 . Although the conflicting claims are not identical, they are not patentably distinct from each other because the novelty of the invention in both cases is the use of Alyssum plants for the recovery of nickel from nickel-contained soil. It is well within the level of one skilled in the art to manipulate soil conditions to obtain optimum range of soil pH, ca and Mg concentrations, or chelating agents to increase nickel availability and its uptake by the plant so that maximum amount of nickel can be recovered . Therefore, the subject matter instantly claimed, a method for recovering nickel or selectively increasing the amount of nickel recovered from nickel containing soil comprising elevating soil pH with the limestone agents listed in claim 4, and cultivating at least of one the Alyssum plants listed in claim 9 , under soil conditions of calcium concentration of about 20-80%, such that at least from 0.1% to 4% (dry wt basis) of the above ground tissue of said plant is nickel, recovered by drying and combustion, would have been obvious over the subject matter claimed, a method for recovering nickel from nickel containing soil comprising

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cultivating Alyssum plants (listed in claims 4 and 5), in said soil under conditions of soil pH of 4.5 to 6.2, exchangeable Ca concentration of 20% lower than Mg exchangeable concentration, adding chelating agents and ammonium fertilizers, such that at least 2.5% (dry wt basis) of the above ground tissue of said plant is nickel, recovered by drying and combustion, in the patent .

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103© and potential 35 U.S.C. 102(f) or (g) prior art under 35 U.S.C. 103(a).

9. Claims 1-4, 8, 10, 12-13, 16-18, and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raskin et al (5,785,735, filed June 1, 1994) .

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Claims are drawn to a method for selectively increasing the amount of at least one metal recovered from metal containing soil comprising elevating soil pH, and cultivating at least one Alyssum plant in said soil under conditions that would permit said plant to accumulate at least 4.0 % of Ni on dry wt basis in above ground tissues, and whereby the concentration of said metal in said tissues exceeds the concentration of said metal in the soil by factor of 2, 3, or 4.

Raskin et al teach methods for removing lead from lead-containing soil comprising soil treatments including soil pH manipulation to increase the availability of said metal to plant roots, and cultivating Brassica juncea in said soil, whereby the concentration of lead accumulated in the shoots is 30 fold higher than the lead concentration in the soil (see, column 10, Table 1). Raskin et al teaches that preferred metals for their method include Cr, Cd, Ni and Zn (see column 2, lines 20-21) and preferred plants include Alyssum species (see, column 4, 2nd full paragraph). Raskin teaches treating the soil with lime before sowing to maintain soil pH of 5.8-6.2 for optimum removal of Cr, Cd, Ni and Zn by a Brassicaceae plant which includes Alyssum (see, e.g., column 7, lines 58-63). Therefore, a person skilled in the art would have been motivated to use Alyssum plant for the removal or high recovery of Ni with a reasonable expectation of success.

Claims 1-4, 8-18, and 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Raskin et al (5,785,735, filed June 1, 1994) as applied to claims 1-4, 8, 10, 12-13, 16-18, and 38-40, and further in view of Brooks et al (Vegetation 45, pp.183-188, 1981).

Claims are drawn to a method for removing or selectively increasing the amount of at least one metal recovered from metal containing soil comprising elevating soil pH with lime

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agents listed in claim 4, and cultivating at least one metal- hyperaccumulator plant, including the Alyssum plants listed in claims 9 and 14-15, in said soil under conditions of elevated soil pH, Ca concentration of 20-80% , wherein at least 4% (dry wt basis) of nickel is accumulated in above ground tissue, and whereby the concentration of said metal in said tissue exceeds the concentration of said metal in soil by factors of 2, 3, or 4.

Raskin et al teach methods for removing lead from lead-containing soil with a Brassicaceae plant as discussed above. Raskin does not explicitly teach Ni accumulation by Alyssum plants.

Brooks et al teach accumulation of Ni by three different species of Alyssum including A. serpyllifolium and A. malacitanum of claims 9 and 14, from nickel-contaminated soil (see, pages 186-188, Results and Discussion), effect of Ca concentration on Ni uptake, wherein A. malacitanum accumulated 2.0% of Ni (on dry wt basis) in leaves. Therefore, it would have been obvious to one of skilled in the art to use the method of removing heavy metals from metal-contained soil with a Brassicaceae plant and how to manipulate soil pH to increase metal availability to said plant as taught by Raskin et al , and to modify that method by incorporating the specific teachings by Brooks et al for how to selectively remove Ni from Ni-contained soil by using specific Alyssum species, to develop optimum method for the recovery of high amount of Ni with a reasonable expectation of success.

No claim is allowed.

10. Papers relating to this application may be submitted to Technology Sector 1 by facsimile transmission. Papers should be faxed to Crystal Mall 1, Art Unit 1638, using fax number (703) 308-4242. All Technology Sector 1 fax machines are available to receive transmissions 24

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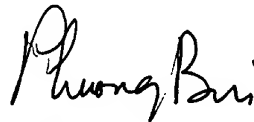
hrs/day, 7 days/wk. Please note that the faxing of such papers must conform with the Notice published in the Official Gazette, 1096 OG 30, (November 15, 1989).

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Medina A. Ibrahim whose telephone number is (703) 306-5822. The Examiner can normally be reached Monday-Thursday from 7:30 AM - 3:00 PM.

If attempts to reach the Examiner by telephone are unsuccessful, the Examiner's supervisor, Paula Hutzell, can be reached at (703) 308-4310.

Any inquiry of a general nature or relating to the status of this application should be directed to the receptionist whose telephone number is (703) 308-0196.

July 6, 2001
mai


PHUONG T. BUI
PRIMARY EXAMINER